Bandwidth Ex Parte Addendum

May 10, 2018

Addendum to Bandwidth FCC Meeting on May 2, 2018

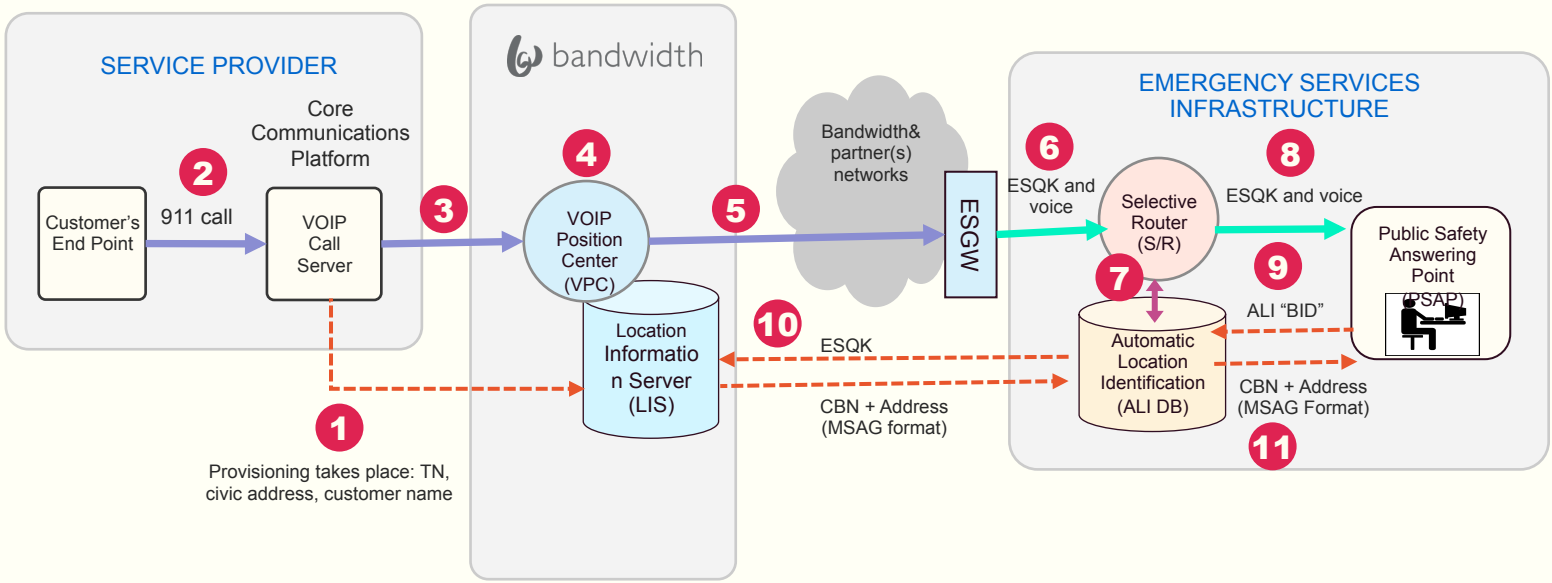
In response to staff requests, Bandwidth is providing additional call-flow examples of VOIP 9-1-1 calls into the ECS Proceeding Record.

- Please Note: 1) To make the diagrams easier to follow, **redundancy** has been removed; and 2) these examples are illustrative only.

A specific item that Bandwidth was asked to expand upon was the Industry Standards that pertain to various interface points in the end-to-end 9-1-1 calling system.

- Sample standards have been identified on the final slide
- Referenced standards are representative and not intended to be all-inclusive of all potentially applicable standards or best-practices.

“Fixed IVOIP” i2 9-1-1 Service (Enhanced)



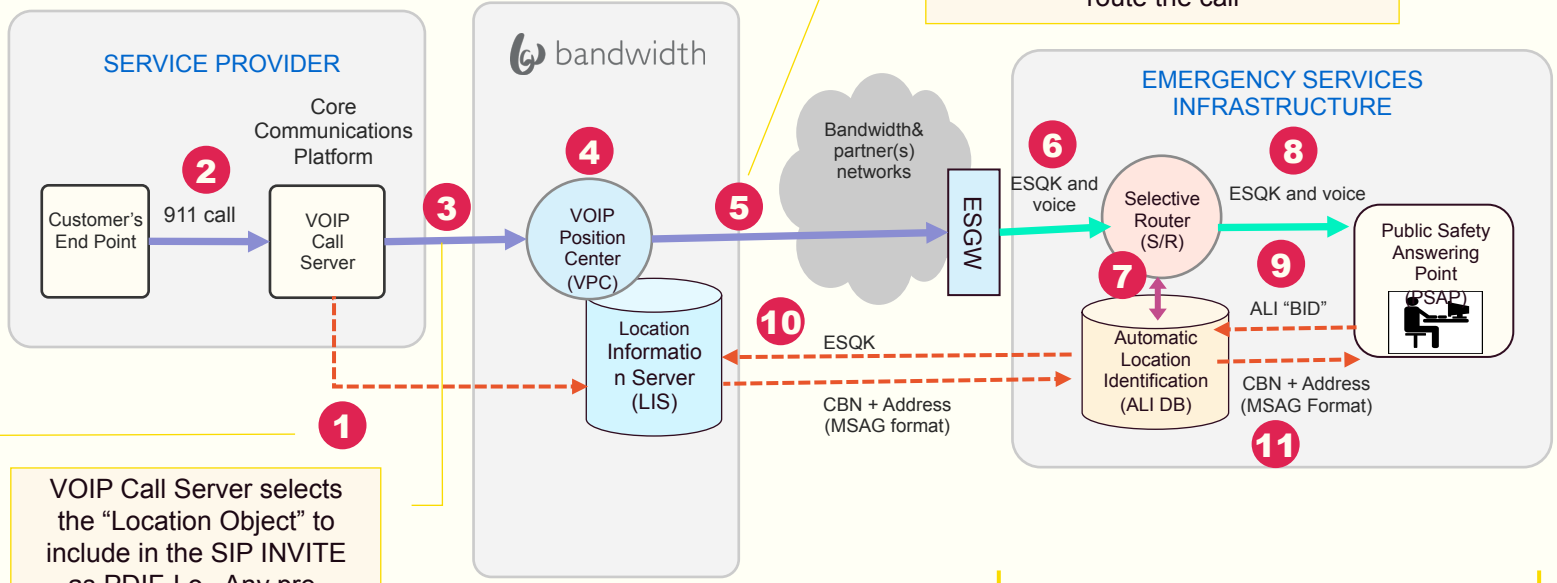
Purple solid line indicates VOIP voice

Green solid line indicates TDM voice

Orange dotted line indicates address data exchange

1. Provisioning of customer name, telephone number and civic address to BW
2. 9-1-1 call placed from customer’s end-point
3. Call delivered to Bandwidth’s redundant POP’s (redundancy not shown)
4. Call routers, called a VOIP Position Center (VPC) at both sites can process the call
5. Bandwidth routes the call to the appropriate redundant Emergency Service Gateway (ESGW) with an ESQK that is specific to the PSAP
6. The ESGW converts VOIP to TDM and sends the call to the Selective Router (SR)
7. SR “dips” the LEC ALI database to obtain the trunk to route the call to the PSAP
8. The PSAP receives the ESQK, also known as a “pseudo-ANI or pANI)
9. The PSAP sends the ESQK to the LEC 911 database for the ALI “bid”
10. The LEC ALI database has the ESQK set to “steer” to the Bandwidth LIS to fetch MSAG address and Call Back Number (CBN)
11. MSAG address and CBN (which is the customer’s TN) displayed at PSAP

“Nomadic IVOIP” 9-1-1 Call Flow with “i3 Location Object”



The call proceeds as SIP PIDF-Lo through the network, however when connecting to Legacy PSAPs, the ESQK mechanism is still used to route the call

Provisioning for all valid TNs separated from all valid civic addresses (Location objects)

VOIP Call Server selects the “Location Object” to include in the SIP INVITE as PDIF-Lo. Any pre-provisioned “Lo” can be used at call time.

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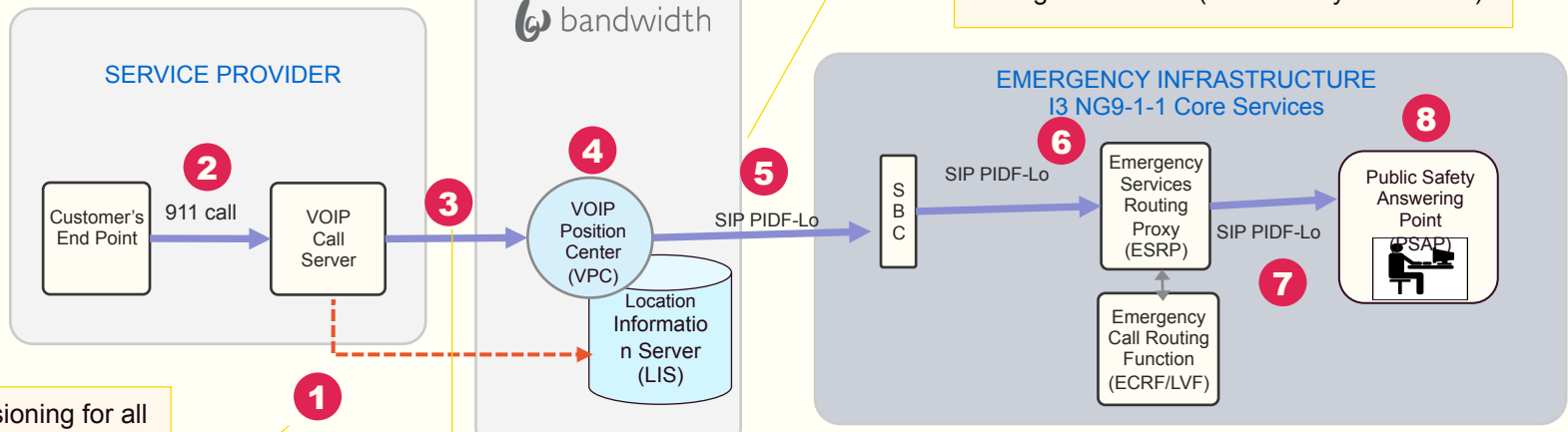
While the S/R, ALI and PSAP infrastructure remain “legacy”, the Bandwidth solution processes the request for address information and Call Back Number using the same i2 process.

“Nomadic IVOIP” 9-1-1 with PIDF-Lo to NG9-1-1



The SIP INVITE with PIDF-Lo proceeds through Bandwidth’s network and enters the NG9-1-1 Emergency Services Intranet at designated SBCs (redundancy not shown)

Provisioning for all valid TNs separated from all valid civic addresses (Location objects)

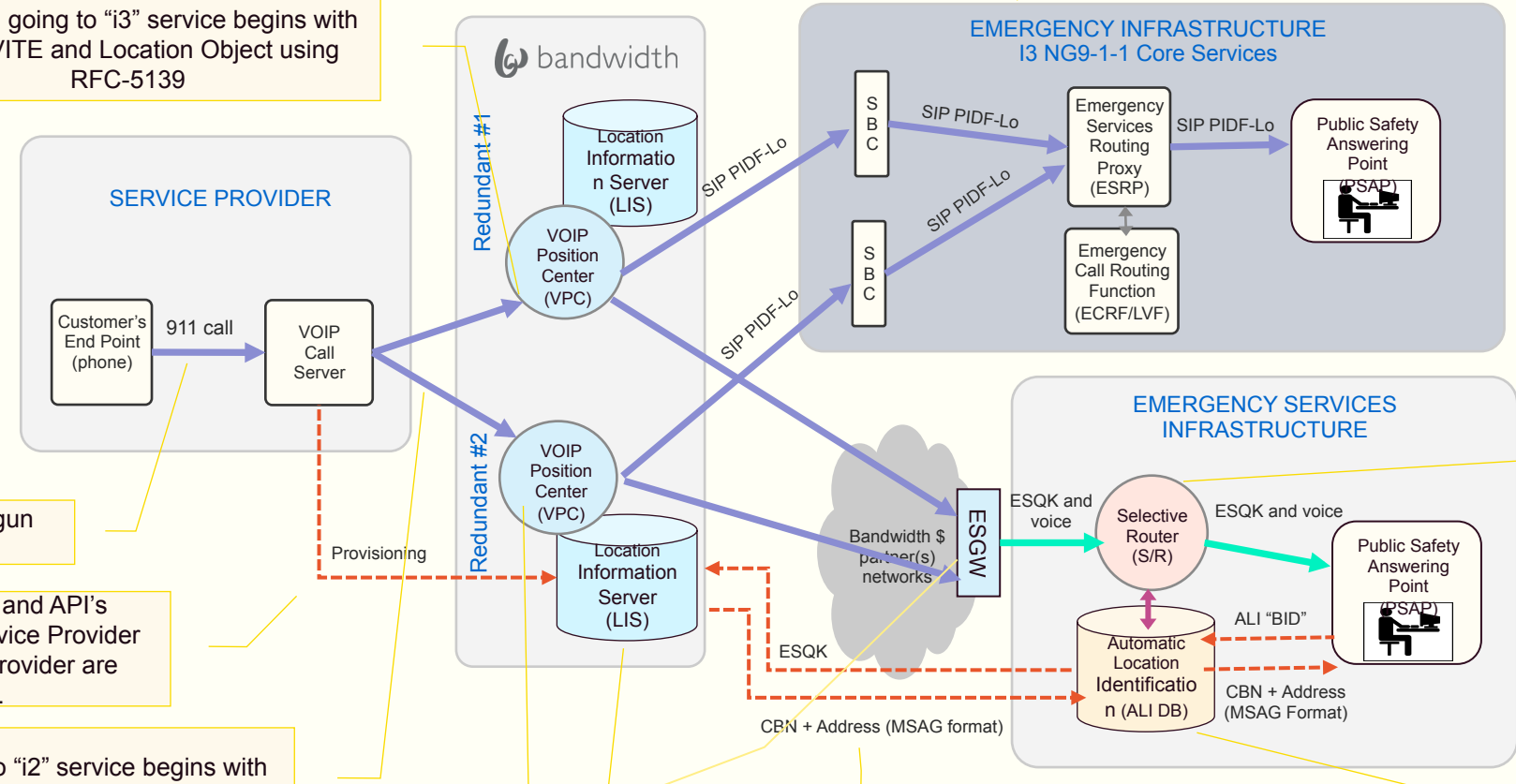
VOIP Call Server selects the “Location Object” to include in the SIP INVITE as PDIF-Lo. Any pre-provisioned “Lo” can be used at call time.

6. The call proceeds through the NG9-1-1 network and is received by the Emergency Service routing Proxy (ESRP). The ESRP uses the Location Object to query the Emergency Call Routing Function for a route to the destination PSAP.
7. The 9-1-1 call proceeds to the PSAP with full SIP PIDF-Lo data including the original TN in the Calling Party Number (no ESQK is needed).
8. The PSAP receives the originating TN, the address (Lo) and customer name directly from the SIP messaging. There is no needed dip to an ALI or other ancillary database.

SOME EXAMPLE STANDARDS INVOLVED IN 9-1-1

Next Generation “i3:” specification is:
NENA-STA-010.2-2016 (originally 08-003)

VOIP call going to “i3” service begins with SIP INVITE and Location Object using RFC-5139



“Normal” VOIP call begun with SIP INVITE

Provisioning portals and API’s between a general Service Provider and a general VPC provider are proprietary.

VOIP call going to “i2” service begins with standard SIP INVITE, no location object.

NENA Interim VoIP Architecture for Enhanced 9-1-1 Services (i2) NENA 08-001,

Enhanced Wireless 9-1-1 Phase II PN-3-3890-RV2-AD1 formerly called *TIA J-STD-036*

NENA Standard Data Formats for 9-1-1 Data Exchange & GIS Mapping 015.10-201X (originally 02-010 v9)

NENA-03-005 January 2004 (Original Issue) Generic Requirements for an Enhanced 9-1-1 Selective Routing Switch

NENA Standard Data Formats for 9-1-1 Data Exchange & GIS Mapping NENA-02-010

bandwidth